What is claimed is:

1 1 A purified nucleic acid comprising a nucleotide sequence that encodes a
2 myofibrillogeneis-inducing RNA (MIR) molecule having at least one functional activity of a
3 native MIR molecule.

1 2. The purified nucleic acid of claim 1, wherein said nucleotide sequence encodes an
2 RNA molecule having a secondary structure that permits specific binding to at least one MIR-
3 binding protein.

1 3. The purified nucleic acid of claim 1, comprising a nucleotide sequence whose
2 complement hybridizes under stringent hybridization conditions to the nucleotide sequence of at
3 least one of SEQ ID NO:2 and SEQ ID NO:3.

1 4. The purified nucleic acid of claim 1, wherein the nucleotide sequence comprises
2 SEQ ID NO:1 and is greater than 166 nucleotides in length.

1 5. The purified nucleic acid of claim 1, wherein the nucleotide sequence shares at
2 least 75% sequence identity with SEQ ID NO:5.

1 6. The purified nucleic acid sequence of claim 1, wherein the nucleotide sequence
2 comprises SEQ ID NO:5.

1 7. The purified nucleic acid of claim 1, wherein a portion of said nucleotide
2 sequence that encodes a MIR molecule comprises a first polynucleotide sequence that shares
3 sequence identity with a second polynucleotide sequence within the 5' untranslated region of a
4 second nucleic acid that encodes an RNA splicing factor.

1 8. The purified nucleic acid of claim 7, wherein said RNA splicing factor is SmN.

9. The purified nucleic acid of claim 8, wherein said first and said second polynucleotide sequences comprise the sequence of SEQ ID NO:6.

10. A purified myofibrillogenesis-inducing RNA (MIR) molecule comprising a ribonucleic acid sequence is a complement of a deoxyribonucleic acid sequence that encodes a myofibrillogeneis-inducing RNA (MIR) molecule having at least one functional activity of a native MIR molecule, wherein said deoxyribonucleic acid sequence encodes a polyribonucleic acid that is between about 167 and about 620 nucleotides in length.

11. The purified MIR molecule of claim 10, wherein said deoxyribonucleotide sequence comprises the sequence of SEQ ID NO:1.

12. The purified MIR molecule of claim 10, wherein said deoxyribonucleotide sequence comprises the sequence of SEQ ID NO:5.

13. A vector comprising a purified nucleic acid that encodes a myofibrillogeneis-inducing RNA (MIR) molecule having at least one functional activity of a native MIR molecule.

14. The vector of claim 13, wherein the purified nucleic acid further encodes a MIR-binding protein.

15. A method of inducing a cardiac muscle phenotype in a cell, said method comprising the steps of:

a) providing a cell comprising at least one MIR-binding protein; and

b) contacting said cell with at least one MIR molecule that specifically binds to said at least one MIR-binding protein, in an amount sufficient to induce a cardiac muscle phenotype in said cell.

16. The method of claim 15, wherein said cardiac muscle phenotype comprises formation of myofibrils or rhythmic contraction of the cell.

17. The method of claim 15, wherein said MIR-binding protein is selected from the group consisting of MIR-binding proteins having molecular weights of about 11-13 kDa and about 28-30 kDa.

18. The method of claim 15, wherein said at least one MIR molecule is encoded by a nucleic acid comprising a sequence that is less than 166 nucleotides in length and shares at least 75% sequence identity with SEQ ID NO:1.

19. The method of claim 15, wherein said at least one MIR molecule is encoded by a nucleic acid comprising a sequence that is at least 167 nucleotides in length and shares at least 75% sequence identity with SEQ ID NO:5.

20. The method of claim 15, wherein said at least one MIR-binding protein is exogenously added to said cell.

21. The method of claim 15, wherein said cell is a stem cell.

22. The method of claim 15, wherein said step (b) comprises contacting said cell with a vector that comprises a nucleic acid that encodes said at least one MIR molecule.

23. The method of claim 21, wherein said nucleic acid further comprises a nucleotide sequence that encodes a MIR-binding protein.

24. The method of claim 21, wherein said cell is comprised within a heart.